

REMARKS

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. § 1.114(c), and in light of the remarks which follow, are respectfully requested.

Claim 3 has been rewritten in independent form. Claim 5 has been amended to depend from claim 3. Claim 1 has been canceled without prejudice or disclaimer. Claim 2 was previously canceled. No new matter has been added.

Upon entry of the Amendment, claims 3-5 will be all the claims pending in the application.

I. Response to Rejection under 35 U.S.C. § 103(a)

Claims 1-5 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over Japanese Patent Document No. JP 2003/183453 ("Toyoda"). Applicants respectfully submit that the present claims as amended are patentable over Toyoda for at least the following reasons.

Sole independent claim 3 recites a solvent dispersion for a printing ink, wherein a polyethylene-based wax that is produced with a metallocene-based catalyst and is subjected to oxidative modification, and specified by the following (i) to (vii):

- (i) being an ethylene homopolymer or a copolymer of ethylene and at least one α -olefin selected from α -olefins having 3 to 20 carbon atoms,
- (ii) having the intrinsic viscosity $[\eta]$ determined in decalin at 135°C ranging from 0.06 to 0.35 dl/g,
- (iii) having the ratio (Mw/Mn) of weight average molecular weight (Mw) to number average molecular weight (Mn) determined by gel permeation chromatography (GPC) ranging from 1.7 to 3.2,

- (iv) having the ratio (M_z/M_w) of z-average molecular weight (M_z) to weight average molecular weight (M_w) determined by gel permeation chromatography (GPC) ranging from 1.5 to 2.0,
- (v) having the density ranging from 920 to 980 kg/m³,
- (vi) having the penetration hardness of 5 dmm or less, and
- (vii) having the acid value ranging from 0.3 to 9.9 KOH-mg/g, is dispersed in the form of fine particles having a volume average particle diameter ranging from 0.3 to 10 μ m and at a ratio of 5 to 50 wt.% based on the total weight of the solvent dispersion in a non-aromatic solvent.

Toyoda discloses an aqueous dispersion of an ethylene-based polymer composition comprising (A) an ethylene-based polymer having an M_n of 400-8,000, an M_w/M_n of 3 or less, a specific relation between a crystallization temperature and a density that is in the range of 850-980 kg/m³ and a volume average particle size of 0.1-20 μ m, and (B) a modified ethylene-based polymer being modified with the unsaturated carboxylic acid or its derivative and having an acid value of 30-100 KOH-mg/g, or modified with a sulfonate and having its content of 0.1-50 mmol equivalents in terms of -SO₃- per gram of the modified polymer (claims 1 and 4).

It is noted that Toyoda's modified ethylene-based polymer has an acid value of 30-100 KOH-mg/g, which is outside the range recited in present claim 3. Moreover, Toyoda fails to disclose a polyethylene-based wax which is produced with a metallocene-based catalyst and is subjected to oxidative modification, and having (iii) an M_w/M_n ranging from 1.7 to 3.2, (iv) an M_z/M_n ranging from 1.5 to 2.0, (v) a density ranging from 920 to 980 kg/m³, and (vi) a penetration hardness of 5 dm or less, as recited in present claim 3.

Toyoda further describes that when the acid value is within the described limits, “the hygroscopic property of the particles obtained from a water dispersing element is moderate, and there is tendency to excel in a water resisting property, weatherability, etc. Moreover, the phase inversion after water addition is enough, and there is a tendency for a water dispersing element to be obtained with high yield” (paragraph [0113] of the English translation). As such, Toyoda teaches away from using a polyethylene-based wax having (vii) an acid value of less than 30 KOH-mg/g, or 0.3-9.9 KOH-mg/g, as recited in present claim 3.

Toyoda also discloses a method for preparing a hydrocarbon solvent dispersion of the ethylene polymer composition in paragraphs [0125] to [0132] (see also column 14, line 20 to column 15, line 50 of U.S. Patent No. 6,858,765).

According to the above mentioned method of Toyoda, a hydrocarbon solvent dispersion of the ethylene polymer composition is specifically prepared by neutralizing a basic substance used in the preparation of the ethylene polymer composition aqueous dispersion with inorganic or organic acids, separating the resultant ethylene polymer composition particles from the water, and then redispersing the cake after washing with a hydrophilic solvent.

In the above neutralization step, a person having ordinary skill in the art easily understands that the acid parts maldistribute on the surface of the neutralized ethylene polymer because acid parts have higher affinity with water than ethylene polymer parts that are hydrophobic.

On the other hand, various additives are disclosed in order to increase the stability in storage of the ethylene polymer composition organic solvent dispersion in paragraph [0133] of Toyoda (see also column 15, lines 51-60 of U.S. Patent No. 6,858,765). This suggests that

the ethylene polymer composition organic solvent dispersion of Toyoda is unstable in storage in the organic solvent.

Applicants advise that Toyoda's ethylene polymer composition organic solvent dispersion is unstable not only because its acid value is higher than that recited in present claim 3, but also the polymer particles of Toyoda easily agglomerate in the organic solvent resulting difficulties in storage due to maldistribution of the acid parts on the surface of the ethylene particles.

On the contrary, as shown in Table 2 of the present specification, Dispersions 1-4 exhibited superior results to Comparative Examples in terms of storage stability in evaluation as a solvent dispersion without additives.

Thus, it is apparent that the organic solvent dispersion of the polyethylene-based wax in the presently claimed invention possesses superior storage stability to that of Toyoda and is suitable for the additives of a printing ink.

Applicants believe that this is because the presently recited acid value is lower than that of Toyoda, and further, the fine polyethylene-based wax in the presently claimed invention that has no maldistributed acid parts on the surface thereof can be dispersed in the organic solvent directly without any unnecessary steps.

In summary, Toyoda not only fails to disclose all the features recited in present claim 3, it also fails to disclose or suggest the above noted unexpected results which can be obtained in the presently claimed invention.

In view of the foregoing, Applicants respectfully submit that present claim 3 is patentable over Toyoda, and thus the rejection should be withdrawn. Additionally, claims 4 and 5 depend from claim 3, and thus are patentable over Toyoda at least by virtue of their dependency.

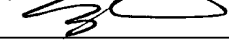
II. Conclusion

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at his earliest convenience.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

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By: 
Fang Liu, Ph.D.
Registration No. 51283

P.O. Box 1404
Alexandria, VA 22313-1404
703 836 6620